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Effect of feeding the sheep at different ages on morphometric indices of duodenum

**Vladimir Ivanovich Trukhachev*, Vladislav Anatoljyevich Porublyov,
Nikolai Viktorovich Agarkov, and Tamara Ismeljyevna Botasheva.**

Stavropol State Agrarian University, Faculty of Veterinary Medicine, Zootekhnicheskij lane 12, Stavropol 355017, Russia

ABSTRACT

As a result of studies on the effect of feeding sheep on morphometric indices of duodenum during postnatal ontogenesis from birth to 18 months of age has been found, that the most intensive increase in the area of the bowel wall occurs from birth to one month of age animals. The internal volume, the volume of the walls, the total volume of the intestine and its mass is most intense increase in sheep from one month to four months of age, and the internal diameter - from birth to four months of age. Duodenum length reaches the most significant changes in animals from four to 18 months of age. The established age-related changes of morphometric parameters of the duodenum of sheep due to changes in diets of animal feeding, growth, development and differentiation of organs, systems, and devices of their body.

Keywords: intestine of sheep, morphology of animals, feeding sheep

**Corresponding author*

INTRODUCTION

Sheep, along with other sectors of the productive livestock is one of the leading places in the economy, as a source of meat and wool. For its further successful development and intensification requires a deep and thorough study of the structure and physiology of the animal organism, its species, age features and adaptive variability.

A final digestion of nutrients as well as their entry into the blood and lymph animal organism is carried out in the intestine. Violations in its structure and functioning may be accompanied by a decrease in the productivity of animals, contribute to the development of diseases invasive and infectious etiology, various forms of abdominal pathologies (inversions, intussusception, necrosis of the wall, peritonitis, etc.). Knowledge of the normal anatomy of sheep intestine is necessary to determine the age characteristics of their intestinal digestion, optimizing feed rations animals, diagnosis, prevention and treatment of diseases of different etiologies digestive system, and other systems.

The morphology of the gastrointestinal tract of ruminants, and particularly their feeding studied in various years P.V. Gruzdev [1], V.A. Porublev [2, 3], V.I. Trukhachev et al. [4, 5, 6], S.N. Chebakov [7], V.A. Porublyov, F.A. Meshcheryakov, S.A. Pozov [8], K. Tanudiamadja, R. Getti [9]. Currently, however, it remains unexplored influence of feeding the sheep at different ages on the morphometric parameters of the initial segment of the small intestine department - the duodenum. All of the above was the basis for a detailed study of the effect of feeding the sheep of different age groups on the morphometric parameters of the duodenum.

MATERIALS AND METHODS

The material for the research were taken 20 intestines of sheep Stavropol breed. The selection of material was carried out in the slaughterhouses of teaching and experimental farm of the Stavropol State Agrarian University of sheep of the Stavropol breed four age groups: newborns, one-month, four-month and 18-month. Material was obtained from clinically healthy animals after euthanasia according to the "Rules of work with the use of experimental animals" by exsanguination. Age animal was placed on the management of documentation and the dental formula.

The choice of the above four age groups of animals was due to changes in their feeding. In the neonatal period, animals received colostrum initially and then only breast milk. In connection with the start of feeding young sheep coarse and concentrated feeds with 14-21 days, it was considered appropriate to follow the changes of morphometric parameters animals duodenum months of age, when, according to the hypothesis, they had to be observed. Conversion young sheep on a diet that includes only the gross, green and concentrated feed was carried out with 3.5 months of age, therefore, in order to observe the most pronounced changes in morphometric parameters animals duodenum for the study was selected material from the four months age. As we know, sexual and physiological maturity of the sheep to be completed 18 months of age. In addition, feeding animals according to the norms of the adult population was carried out within 14 months after weaning calves from the ewes, according to the hypothesis that the research should lead to the most pronounced changes in morphometric parameters of sheep duodenal ulcer.

We used the following methods: preparation, morphometry and statistical.

The length of the inner diameter of the intestine, the internal volume, the volume of the walls, the total volume of the mucous membrane area, weight, bowel wall density is determined according to the procedures proposed by P.V. Gruzdev and V.A. Porublev [2, 3].

RESULTS AND DISCUSSION

The duodenum of sheep originated in the pyloric region of rennet, heading in the direction of the liver and makes her cranial bending, then dorsokaudal to the right kidney to the entrance to the pelvis, forming caudal gyrus, then turns up to the cranial forward bending and passes into the jejunum.

All anatomical guides no clear boundary transition duodenum to the jejunum. In our studies we found that the boundary between the duodenum and jejunum passes at the level of the last rib before the first curl of the jejunum in the entrance of the first branch of the jejunal artery in the intestinal wall. The duodenum is located in the right hypochondrium, and hanging on the short mesentery.

Table 1: Morphometric parameters duodenum sheep of the Stavropol breed

Indicators	Age of animals			
	Newborns	One month	Four months	18 months
Length cm	19.56±0.47	29.40±0.32	44.50±70.53	70.53±0.79
Inner diameter, mm	6.33±0.27	9.13±0.24	13.13±0.35	15.53±0.31
The internal volume, cm ³	7.13±0.23	19.66±0.33	60.23±0.48	124.97±3.27
Wall volume, cm ³	0.93±0,00	2.20±0.01	7.27±0.01	22.43±1.34
Total volume, cm ³	8,03±0.01	21.74±1.25	67.62±0.78	146.69±5.26
Wall thickness, mm	0.14±0.02	0.26±0.026	0.43±0.02	0.51±0.02
Wall area, cm ²	36.78±0.15	84.16±2.13	185.13±2.66	342.90±15.58
Weight, g	1.09±0.10	2.40±0.17	8.46±0.23	26.30±0.64
Density, g / cm ³	1.15±0.00	1.14±0.00	1.16±0.00	1.16±0.00

The duodenum of sheep of the Stavropol breed for the first month of postnatal development is increased in length by 1.5 times, with up to four months - in 1.5 times, from four to 18 months of age, sheep - 1.58 times. The most intense increase duodenum sheep length occurs during postnatal development in four to 18 months. For the first 18 months of postnatal development of duodenal ulcer length in sheep increased by 3.6 times.

The inner diameter of the duodenum of sheep for the first month of postnatal development increases 1.44 times, with up to four months - 1.44 times, from four to 18 months of age - 1.18 times. The most intensive increase in the internal diameter of the duodenum of sheep takes place during the postnatal ontogenesis from birth to four months. For the first 18 months of postnatal development of the internal diameter of the duodenum of sheep increased by 2.45 times.

The thickness of the wall of the duodenum of sheep during the first month of postnatal development is increased by 1.86 times, with up to four months - to 1.65 times, from four to 18 months of age - 1.19 times. The most intensive increase in the duodenal wall thickness sheep occurs during postnatal ontogenesis from birth to one month of age. For the first 18 months of postnatal development of the thickness of the wall of the duodenum of sheep increased by 3.64 times.

The internal volume of the duodenum of sheep during the first month of postnatal development increases 2.76 times, with up to four months - to 3.06 times, from four to 18 months of age - 2.07 times. The most intensive increase in the internal volume of the duodenum of sheep takes place during the postnatal ontogeny of one to four months of age. For the first 18 months of postnatal development of the internal volume of the duodenum of sheep increased by 17.53 times.

Weight duodenal sheep during the first month of postnatal development is increased by 2.2 times, with up to four months - to 3.53 times, from four to 18 months of age - in 3,11 times. The most intensive increase in mass of the duodenum of sheep takes place during the postnatal ontogeny of one to four months of age. For the first 18 months of postnatal development of the duodenum weight of sheep increased by 24.8 times.

The volume of the bowel wall sheep for the first month of postnatal development increases 2.37 times, with up to four months - by 3.3 times, from four to 18 months of age - 3.09 times. The most intensive increase in the volume of the wall of the duodenum of sheep takes place during the postnatal ontogeny of one to four months of age. For the first 18 months of postnatal development of the volume of the duodenum wall in sheep increased by 24.12 times.

The total volume of the duodenum of sheep for the first month of postnatal development increases 2.71 times, with up to four months - to 3.11 times, from four to 18 months of age - 2.17 times. The most intensive increase in the total volume of the duodenum of sheep takes place during the postnatal ontogeny of one to four months of age. For the first 18 months of postnatal development of the full scope of the duodenum of sheep increased by 18.27 times.

The area of the wall of the duodenum of sheep during the first month of postnatal development increases 2.29 times, with up to four months - by 2.2 times, from four to 18 months of age - 1.85 times. The most intensive increase in the area of the duodenum wall sheep occurs during postnatal ontogenesis from birth to one month of age. For the first 18 months of postnatal development of duodenal wall area in sheep increased by 9.32 times.

The density of the intestinal wall for the entire period of postnatal ontogenesis remains virtually unchanged at an average of $1,14-1,16 \pm 0,00 \text{ g / cm}^3$.

CONCLUSION

1. The most intensive increase in the intestinal wall area comes from the birth of the animals until one month of age.
2. The inner diameter of the duodenum of sheep reaches the most significant changes from birth to four months of age.
3. The internal volume, the volume of the walls, the total volume of the intestine and its mass is most intense increase in sheep from one month to four months of age.
4. Duodenum length reaches the most significant changes in sheep from four to 18 months of age.
5. The established age-related changes of morphometric parameters of the duodenum of sheep due to changes in diets of animal feeding, growth, development and differentiation of organs and systems of their body.

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